This listing of claims will replace all prior versions of claims in the present application:

Listing of Claims:

1-51. (canceled)

52. (original) A method of direct writing a waveguide in a silica-based material substrate comprising the steps of:

producing a pulsed laser beam having a wavelength beyond an absorption edge of the silica-based material substrate and a pulse duration less than 150 femtosconds (fs);

focusing the laser beam to a spot within the silica-based material substrate;

adjusting pulse energy of the laser beam within a range in which an accompanying generation of heat has the effect of saturating refractive index increases associated with incremental increases in the pulse energy; and

relatively translating the beam and silica-based material along a scan path to provide for increasing refractive index along a scan path within the silica-based material while incurring substantially no laser-induced breakdown of the material along the scan path that would inhibit effectiveness of the scan path as a waveguide.

53. (original) The method of claim 52 in which the step of focusing includes focusing the laser beam through a numerical aperture greater than 0.2.

54. (original) The method of claim 53 in which the refractive index increase is saturated at less than 1 microjoule (μJ).

55. (currently amended) The method of claim ~~543~~ 54 in which the laser beam has a wavelength of approximately 800 nanometers (nm).

56. (original) The method of claim 55 in which the material is a fused silica and the refractive index increase is saturated at around 0.8 microjoule (μJ).

57. (original) The method of claim 55 in which the material is a borosilicate and the refractive index increase is saturated at around 0.5 microjoule (μJ).

58. (original) The method of claim 54 in which the step of producing includes producing the laser beam with a repetition rate that is slower than a thermal diffusion rate of the silica-based material so that each pulse heats the material independently of adjacent pulses.

59. (original) The method of claim 58 in which the pulse duration is less than 50 femtoseconds (fs).

60. (canceled)